



US005609978A

United States Patent [19]

Giorgianni et al.

[11] Patent Number: **5,609,978**[45] Date of Patent: **Mar. 11, 1997**[54] **METHOD FOR PRODUCING AN ELECTRONIC IMAGE FROM A PHOTOGRAPHIC ELEMENT**

[75] Inventors: **Edward J. Giorgianni**, Rochester;
Brian E. Mittelstaedt, W. Henrietta;
Jose E. Rivera; **Richard A. Simon**,
 both of Rochester, all of N.Y.; **Teresa**
A. Smith, Watertown, Mass.; **James E.**
Sutton, Rochester, N.Y.

[73] Assignee: **Eastman Kodak Company**, Rochester,
 N.Y.

[21] Appl. No.: **466,862**

[22] Filed: **Jun. 6, 1995**

[51] Int. Cl.⁶ **G03F 3/10**; G03C 1/08

[52] U.S. Cl. **430/30**; 430/502; 430/503;
 430/505; 430/506; 430/507; 430/508; 430/509;
 430/510; 358/531; 358/527; 358/505; 358/506;
 358/515; 358/518

[58] Field of Search 358/531, 527,
 358/505, 506, 515, 518; 430/502, 503,
 505, 506, 507, 508, 509, 510, 30

[56] **References Cited****U.S. PATENT DOCUMENTS**

5,389,506 2/1995 Sutton 430/509
 5,391,443 2/1995 Simons et al. 430/21

Primary Examiner—Mark F. Huff

Attorney, Agent, or Firm—Raymond L. Owens

[57] **ABSTRACT**

A photographic element, is disclosed which includes a support and at least three silver halide emulsion layers, that records exposure information. The exposure information is recorded in three image-recording units and wherein the spectral sensitivities of said image-recording units are chosen such that the average color error, $\overline{\Delta E^*_{ab}}$, is less than or equal to 3.1. ΔE^*_{ab} is computed for a specified set of test colors of known spectral reflectance, and the light source is specified as D₆₅. ΔE^*_{ab} is the average CIE 1976 (L*a*b*) ΔE^*_{ab} between the CIE 1976 (L*a*b*)-space coordinates of said test colors and the CIE 1976 (L*a*b*)-space coordinates corresponding to transformed exposure signals. The transformed exposure signals are formed by applying an exposure-space matrix to the exposure signals derived from the photographic element to transform the derived exposure signals to exposure signals corresponding to the color-matching functions of the CCIR Recommendation 709 primary set. The exposure-space matrix is derived so as to minimize

$$\sum_{i=1}^{190} (\Delta E^*_{ab,i})^2,$$

and noise-gain factor, Ψ , defined as the sum of the square roots of the sum of the squares of each row of the elements in the exposure space matrix is less than or equal to 6.5.

19 Claims, 8 Drawing Sheets

